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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WAI, ERIC CHARLES	

ART UNIT	PAPER NUMBER
2195	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/750,583	JIANG ET AL.	
	Examiner	Art Unit	
	ERIC C. WAI	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-21 are presented for examination.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5, 12-13, 19-22, 26-27, and 33-34 of copending Application No. 10/750,589. Although the conflicting claims are not identical, they are not patentably distinct from each other.

4. For example, claim 1 of copending Application No. 10/750,589 recites placing a thread in an inactive state in response to a predetermined condition and sending a

message from a semaphore to change the state of the thread. Claim 1 of the present application performs the substantially the same steps. Claim 1 of copending Application No. 10/750,589 differs only in that the threads are intended to be used to process graphical elements of an image. It would have been obvious to one of ordinary skill to try to extend the teachings to imagine processing.

5. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwok et al. (US Pat No. 5,951,672 hereinafter Kwok) in view of Wenniger (US Pat No. 6,018,785).

8. Kwok was cited in the last office action. Wenniger was disclosed in IDS dated 3/31/2005

9. Regarding claim 1, Kwok teaches a method comprising:

placing an executable thread of instructions in an inactive state in response to detection of at least one of a set of predetermined conditions (col 4 lines 35-44, wherein the first thread is in a waiting state after testing variables linking the two threads);

resuming execution of the first thread of instructions in response to the semaphore entity (col 4 lines 35-44, wherein the task is executed).

10. Kwok does not teach sending a message from a semaphore to control circuitry to execute the thread of instructions to change a state of the thread of instructions from the inactive state. However, Wenniger teaches using an active semaphore to generate an interrupt signal whenever a semaphore status changes (col 6 lines 1-22). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kwok to use an active semaphore. One would be motivated by the desire to reduce unnecessary resource usage caused by continuous polling of passive semaphores as indicated by Wenniger (col 6 lines 10-12).

11. Regarding claim 2, Kwok teaches that changing the state of the thread of instructions from the inactive state comprises changing the state of the thread of instructions to an active state (col 4 lines 33-44, wherein the task goes from waiting to executing).

12. Regarding claim 3, Kwok teaches executing the thread of instructions when in the active state (col 4 lines 33-44, wherein the task is being executed).

13. Regarding claim 4, Kwok teaches that the set of predetermined conditions comprises an unresolved dependency (col 3 line 64 to col 4 line 11, wherein there is an unresolved dependence on the work buffer).

14. Regarding claim 5, Wenniger teaches wherein the set of predetermined conditions comprises a response from the semaphore indicating that a resource corresponding to the semaphore is unavailable (col 6 lines 12-16, wherein process B must wait for receipt of the interrupt).

15. Regarding claim 6, Kwok teaches maintaining an indication of a state of each of a plurality of executable threads of instructions (col 4 lines 1-11, wherein state variables for each thread are consulted).

16. Regarding claim 7, Kwok teaches that the indication of the state of each thread comprises a state variable corresponding to a dependency, if any, of an associated thread (col 4 lines 1-11, wherein state variables for each thread are consulted).

17. Regarding claims 8-10, they are the apparatus claims of claims 1, 6, and 10 above. Therefore, they are rejected for the same reasons as claims 1, 6, and 10 above.

18. Claims 11-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wenniger (US Pat No. 6,018,785).

19. Regarding claim 11, Wenniger teaches an apparatus comprising:

an execution circuit to receive and execute a thread of instructions, wherein the execution circuit transmits a semaphore request message and places the thread in an inactive state in response to the thread of instructions requiring a resource having an associated semaphore (col 6 lines 12-22, wherein the requesting process must await an interrupt from the semaphore); and

a semaphore entity coupled with the execution circuit to receive the semaphore request message from the execution circuit and to selectively grant control of the semaphore in response to the semaphore request message by transmitting a semaphore acknowledge message to the execution circuitry, wherein the execution circuitry, in response to receiving the semaphore acknowledge message, removes the thread of instructions from the inactive state (col 6 lines 12-22, where upon receiving the interrupt, the thread queries the semaphore).

20. Wenniger does not explicitly teach that the thread of instructions is paced in an inactive state. Wenniger only teaches that the thread awaits the interrupt from the hardware semaphore. However, it would have been obvious to one of ordinary skill in the art at the time of the invention, that the thread would be placed in an inactive state. It is well known in the art that threads are stalled when the resources that they require

are unavailable. One would be motivated by the desire to reduce idle execution time of threads awaiting resources as is well known in the art.

21. Regarding claim 12, Wenniger does not teach further comprising: at least one additional execution circuit to execute threads of instructions; and a thread dispatcher coupled with the execution circuit and at least one additional execution circuit to dispatch threads for execution by selected execution circuits.

22. It would have been obvious to one of ordinary skill in the art, at the time of the invention to add one additional execution circuit to execute threads of instructions and a thread dispatcher. It is well known in the art to add additional execution units to increase processing capability of processors.

23. Regarding claim 13, Wenniger teaches that the execution circuitry, in response to receiving the semaphore acknowledge message, resumes execution of the thread of instructions including accessing the resource associated with the semaphore (col 6 lines 12-22).

24. Regarding claim 14, Wenniger teaches that when the thread of instructions is in the inactive state, execution of the instructions ceases and the execution circuitry does not poll the semaphore entity to determine a status of the semaphore request message (col 6 lines 6-12).

25. Regarding claims 15-18, they are the system claims of claims 11-14 above. Therefore, they are rejected for the same reasons as claims 11-14 above.

26. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwok et al. (US Pat No. 5,951,672) and Wenniger (US Pat No. 6,018,785), further in view of Winkeler et al. (US Pat No. 7,237,013).

27. Regarding claim 19, Kwok and Wenniger do not teach placing requests for a semaphore in a queue.

28. However, Winkeler teaches a well known technique of creating a semaphore queue to queue pending requests (col 10 lines 39-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kwok and Wenniger to teach placing requests for a semaphore in a queue. One would be motivated by the desire to keep track of processes that desire access of the resource by queuing them.

29. Regarding claim 20, Wenniger teaches causing a thread to release a semaphore when use of a resource is completed (col 6 lines 12-21, wherein Process A relinquishes control).

30. Regarding claim 21, Winkeler teaches automatically granting the resource to the thread whose request is the next request in the queue (col 10 lines 45-47, wherein each component can obtain the lock “in turn”).

Response to Arguments

31. Applicant's arguments filed 02/15/2008 have been fully considered but they are not persuasive.

32. Applicant argues on pg 6 of Remarks:

“The cited reference to Wenniger teaches an active semaphore, but not one that initiates the change of state in response to the change in conditions. To the contrary, in Wenniger, all that happens is that an interrupt is initiated, apparently to indicate a change of conditions. But Wenniger is careful to point out that his interrupt does not enable the thread to then become active. Instead, it must again poll the resource to determine whether or not it can take the resource because it is possible that some other requester obtained the resource. Thus, Wenniger does not teach a system which enables the granting of the resource when it becomes available.”

33. Examiner disagrees. In Wenniger, the purpose of the interrupt is the same as claimed by Applicant, namely the intended use of the interrupt for causing the “control circuitry to execute the thread of instructions”. Furthermore, the preamble of the method claim uses the language “comprising” thereby leaving the claim open-ended. Therefore, Wenniger’s additional step of polling the resource again to determine the resource is

available does not teach away from the claimed invention, since Wenniger also results in executing the thread of instructions. Even if Applicant's assertion that "Wenniger does not teach a system which enables the granting of the resource when it becomes available" is correct, such language is inapposite as this language does not appear in claim 1.

34. Applicant argues on pg 6 of Remarks:

"Claim 1 requires sending a message "to execute the thread of instructions." In contrast, Wenniger sends an interrupt and all the requester can do in response is to again poll for the resource to see if the requester can access it. The thing that went inactive (execution of the thread in the case of the claim or access to the resource in Wenniger) cannot be immediately activated because Wenniger must re-ask for the resource. Thus, even if Wenniger related to controlling threads, which he does not, the thread could not be activated without still another request for the resource."

35. Examiner disagrees. Wenniger is related to mediating between processes using an active semaphore (col 1 lines 25-28). It is old and well known in the art that process and threads are analogous. All of Applicant's independent claims use the open-ended term, "comprising", that allows for the Wenniger reference to be used as prior art as argued by Examiner above. Since Wenniger results in a thread changing from the inactive state, albeit with the extra polling step, Wenniger reads upon the claimed invention.

Conclusion

36. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric C. Wai whose telephone number is 571-270-1012. The examiner can normally be reached on Mon-Thurs, 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng - Ai An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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